TECHNICAL ADVISOR COMMENTS
LRC-LIX(59)-B

"Upgrade and Refurbishment of a Bench-Scale Entrained-Flow Slagging Gasifier"

Submitted by: Energy & Environmental Research Center

Request for: $129,000; Total Project Costs: $354,000

Principal Investigator: Jason Laumb

Project Duration: 7 Months

Description of the Project: One of the most widely available commercial gasifiers today is the entrained-flow style gasifier. However, there has been little experience with lignite coals in entrained-flow gasification systems. To help overcome the challenges of utilizing lignite coal with commercially available gasification systems, a bench-scale entrained-flow slagging gasifier will be built which will be used for syngas production, cleanup, and separation testing. EERC proposes to upgrade and refurbish an existing bench-scale gasifier.

Technical Peer Reviewers' Key Comments:

Reviewer 06-13
The gasification of low-rank coals using EFG could be the preferred technology when the desired products are a synthesis gas for chemical or hydrogen production. Technical information and data that enable this option to be evaluated could be quite useful**.** Whether or not one is a believer in the Hydrogen Economy, a National Center for Hydrogen Technology is in the national interest as it can provide the gasification technology needed for steam and power generation and the hydrogen and fuel gas needed for heavy oil upgrading. The technology being developed here will be an essential component of that activity and is worth supporting. **Recommendation: Fund**

Reviewer 06-14
The EERC is proposing to upgrade an existing bench-scale drop tube reactor that would provide high temperatures and pressures not previously achievable. The temperatures would exceed 1500 C, representative of a slagging gasifier. Commercial vendors of entrained flow slagging gasifiers have not successfully used ND lignite. However, ND lignite constituents, sodium in particular, are problematic commercial issues. The proposed EERC process upgrades are of low value without producing data with commercial vendor(s) and ND industrial participation. **Recommendation: Do not fund**

Reviewer 06-15
Refurbishing and assembly of the test entrained flow gasifier does not appear to be an overly complex task. It is not obvious, however, and will not become apparent until well after testing commences, whether the design put forward will be capable of the scope of testing required to allow successfully gasifying lignite in entrained flow gasifiers. The very small scale of the test unit – as with nearly all research-scale units – will likely present operational challenges which will later require verification in a larger-scale unit. Since the 'big name' gasifier vendors have not been forthcoming with a solution for employing ND lignite in their designs, it would appear we must try to help ourselves in this effort. The test unit proposed in this funding request could prove beneficial to unlocking the door to a brighter future for our lignite resources. **Recommendation: Fund**

Technical Advisor's Recommendation: Fund
I recommend that the proposal be funded at a level not to exceed $129,000 (small research funds from the Lignite Research Fund) subject to the following conditions:

- Written confirmation of industry participation; and
- There must be at least one Fort Union lignite industry utility sponsor

Conflict of Interest: EERC